

CLAIMS

WHAT IS CLAIMED IS:

5 1. A catheter comprising an elongate tubular member having a proximal end, a distal end, and a passageway defining a lumen extending between the proximal and distal ends, said elongate tubular member comprising:

10 a relatively stiff proximal section comprising a proximal inner tubular liner, a first stiffener comprising a metal alloy, and a second stiffener comprising a non-metal alloy, said first and second stiffeners being coaxially wound exterior to the proximal inner tubular liner; and

15 a relatively flexible distal section comprising a distal inner tubular liner and said second stiffener coaxially wound exterior to the distal inner liner, said first stiffener terminating before reaching said distal section.

20 2. The catheter of claim 1 wherein said second stiffener is interposed between the inner tubular liner and said first stiffener.

25 3. The catheter of claim 1 wherein said first stiffener is interposed between the inner tubular liner and said second stiffener.

30 4. The catheter of claim 1 wherein said first stiffener is a helically wound ribbon.

 5. The catheter of claim 1 wherein said second stiffener is a helically wound ribbon.

 6. The catheter of claim 1 wherein said first stiffener is helically wound in one direction and said second stiffener is helically wound in an opposite direction.

7. The catheter of claim 1 wherein said first and second stiffeners are interwoven to form a braid member.

5 8. The catheter of claim 7 wherein said first and second stiffeners each comprise a ribbon.

9. The catheter of claim 8 wherein said ribbons have a thickness of between 0.3 mil. and 3.5 mil. and a width between 2.5 mil. and 12.0 mil.

10 10. The catheter of claim 7 wherein said first and second stiffeners each comprise four strands.

11. The catheter of claim 7 wherein said braid member has a braid pitch and said braid pitch is not constant along the length of the braid member.

12. The catheter of claim 1 wherein said first stiffener comprises a first braid member and said second stiffener comprises a second braid member.

13. The catheter of claim 1 wherein said second stiffener comprises a material capable of undergoing permanent deformation upon exposure to steam.

14. The catheter of claim 1 wherein said second stiffener comprises a polymer.

15. The catheter of claim 14 wherein said polymer comprises a liquid crystal polymer.

16. The catheter of claim 14 wherein said polymer comprises a material selected from the group consisting of polyimide, polyethylene, polyethylene terephthalate, and Nylon.

17. The catheter of claim 1 wherein said first stiffener comprises a superelastic alloy.

5 18. The catheter of claim 17 wherein said superelastic alloy comprises nickel and titanium.

19. The catheter of claim 1 wherein said first stiffener comprises stainless steel.

10 20. The catheter of claim 1 wherein said first stiffener comprises a material selected from the group consisting of gold, platinum, and copper.

15 21. The catheter of claim 1 wherein said first stiffener comprises a platinum-tungsten alloy.

22. The catheter of claim 1 wherein the proximal and distal inner tubular liners each comprise a polymer.

20 23. The catheter of claim 22 wherein the polymer is selected from the group consisting of polyimide, polyamide, polyester, polyethylene, polypropylene, polyvinyl chloride, polyfluorocarbons, polyurethane, polysulfone, ethyl vinyl acetate, polyether block amide, styrene-ethylene/butylene-styrene, styrene-butadiene-styrene, polyethylene terephthalate, and their mixtures, alloys, blends, copolymers, and block copolymers.

25 24. The catheter of claim 1 wherein said proximal section comprises a proximal outer cover exterior to said first and second stiffeners, and said distal section comprises a distal outer cover exterior to said second stiffener.

25. The catheter of claim 24 wherein the proximal and distal outer covers
comprise a material selected from the group consisting of polyimide, polyamide,
polyether block amide, styrene-ethylene/butylene-styrene, styrene-butadiene-
styrene, polyethylene, polypropylene, polyvinyl chloride, fluoropolymer,
5 vinylidene fluoride, polyurethane, and their mixtures, alloys, copolymers, and
block copolymers.

26. The catheter of claim 24 wherein the proximal and distal outer covers
are integrally formed and comprise a polymer which can be heat-shrunk onto said
10 first and second stiffeners.

27. The catheter of claim 24 wherein at least one of the inner tubular liner
and the outer covers are radiopaque.

28. The catheter of claim 1 further comprising a removable, slidable
15 guidewire placed interior to and in slidable relationship to said distal and proximal
sections.

29. The catheter of claim 1 wherein said second stiffener comprises a
20 helically wound ribbon having a rectangular cross-section extending generally
parallel to a longitudinal axis of the catheter in said proximal section, and
generally perpendicular to the longitudinal axis of the catheter in said distal
section.

30. A catheter comprising an elongate tubular member having a proximal end, a distal end, and a passageway defining an inner lumen between the proximal and distal ends, said elongate tubular member comprising:

5 a relatively stiff proximal section comprising an inner tubular liner, a proximal braid member comprising at least one metal alloy strand and at least one non-metal alloy strand, and a proximal outer cover, said braid being coaxially wound exterior to the inner tubular liner; and

10 a relatively flexible distal section comprising the inner tubular liner and a distal braid member comprising said at least one non-metal alloy strand, and a distal outer cover, said at least one metal alloy strand terminating before reaching said distal section.

15 31. The catheter of claim 30 wherein said metal alloy strand and said non-metal alloy strand each comprise a ribbon.

20 32. The catheter of claim 31 wherein said ribbons have a thickness of between 0.5 mil. and 3.5 mil. and a width between 2.5 mil. and 12.0 mil.

25 33. The catheter of claim 30 wherein said at least one metal alloy strand comprises four metal alloy strands and said at least one non-metal alloy strand comprises four non-metal alloy strands.

30 34. The catheter of claim 30 wherein said non-metal alloy strand comprises a polymer.

35. The catheter of claim 34 wherein said polymer comprises a liquid crystal polymer.

36. The catheter of claim 34 wherein said polymer comprises a material selected from the group consisting of polyimide, polyethylene, polyethylene terephthalate, and Nylon.

5 37. The catheter of claim 30 wherein said metal alloy strand comprises a superelastic alloy.

38. The catheter of claim 37 wherein said superelastic alloy comprises nickel and titanium.

10 39. The catheter of claim 30 wherein said metal alloy strand comprises stainless steel.

15 40. The catheter of claim 30 wherein said metal alloy strand comprises a platinum-tungsten alloy.

41. The catheter of claim 30 wherein the inner tubular liner and the proximal and distal outer covers comprise a polymer.

20 42. The catheter of claim 30 further comprising a removable, slidable guidewire placed interior to and in slidable relationship to said distal and proximal sections.

25 43. The catheter of claim 30 wherein said distal section is disposed at the distal end of the catheter.